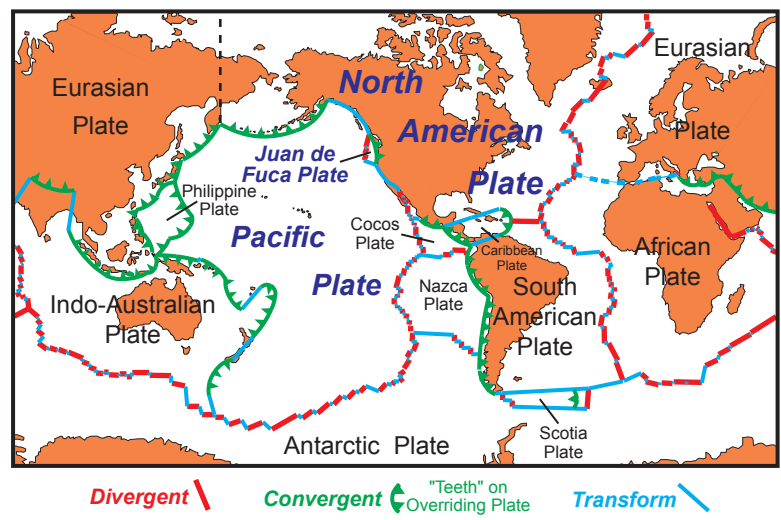


# On the Boundary of Change

Boundaries limit and divide. They mark where one thing ends and another begins. Boundaries are also places of dynamic change. Along the air/water boundary light bends, or refracts, as it leaves one medium and enters another. Along the cell membrane hormones initiate chemical reactions within the cell. Along geologic boundaries landscapes are shaped. The San Andreas Fault is such a boundary, the division between two great tectonic plates, the Pacific Plate and the North American Plate. It is also the site of geologic forces that give rise to earthquakes and shape the land as we know it.

## Along Plate Boundaries

Point Reyes National Seashore lies on the eastern edge of the Pacific plate, an oceanic plate underlying nearly the entire Pacific



From *Parks and Plates*, Robert J. Lillie, 2005

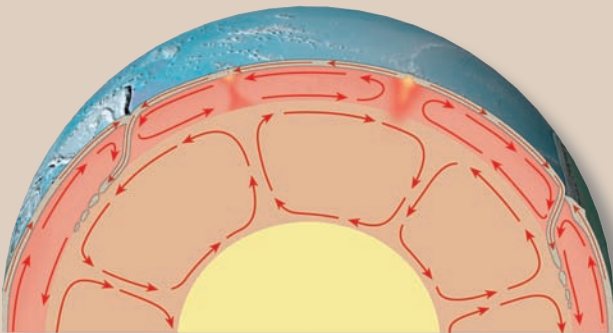
The major tectonic plates of the world form a global moving jigsaw puzzle where plates diverge, converge or slide past one another along plate boundaries.

Ocean from the North American west coast north to Alaska, west to Japan, and south to New Zealand. East of the Seashore across the Olema Valley the North American plate underlies all of North America and Greenland to the center of the Atlantic Ocean. Tomales Bay and the narrow 12-mile long Olema Valley that cradles the Shoreline Highway is the San Andreas Fault. The fault divides two landmasses of differing geologies. East of the fault lie rocks known as the Franciscan series, a combination of greywacke, shale, chert, limestone, and volcanics. The Seashore west of the fault is grounded in granite, the same found in Monterey. The juxtaposition of these two land masses results from geologic forces along the San Andreas Fault.

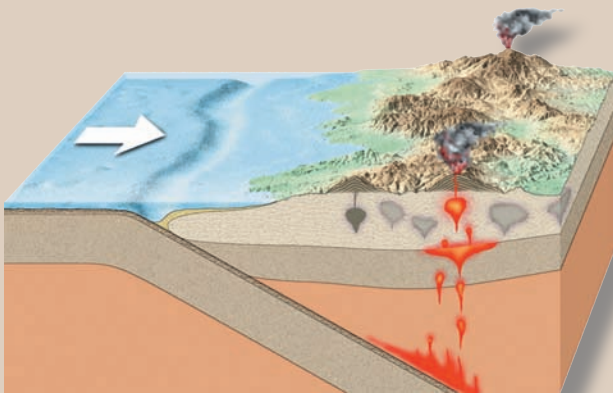
Not only do two plates meet along the San Andreas Fault, but they move against each other. The forces causing this movement lie more than 90 miles (150 km) below our feet in the earth's mantle. Currents of magma slowly circulate up from within the mantle, spread out under the oceanic and continental crusts, carry the plates along then sink to circulate again. Like a crowded bumper car rink, the plates crash and grind into each other as they move. It is along plate boundaries where the action takes place.

## Types of Plate Boundaries

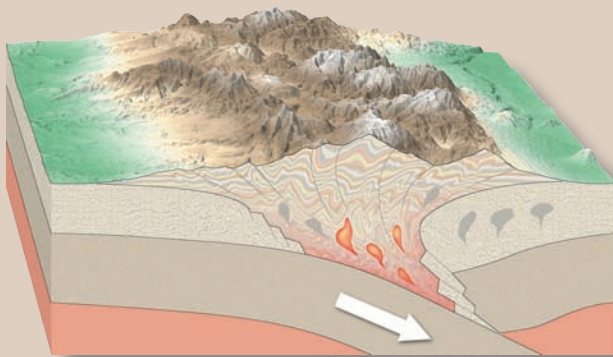
Monumental change occurs along plate boundaries. When oceanic and continental plates collide, they ignite volcanoes and raise mountains. The Sierra Nevada, Cascades, and Andean Ranges emerged when oceanic plates sank below, or subducted beneath, continental plates. The impact of two continental plates compresses the crust along the boundary thrusting land into mountains thousands of feet high, as in the Himalayas. Diverging plate boundaries, most often between oceanic plates, spawn new crust as hot magma bleeds up between the plates, hardens into new seafloor, and pushes the existing seafloor away from the rift on both sides. The San Andreas Fault is not the site of plate collisions or diversions but of lateral, or transform, movement where the plates slide past one another, the Pacific Plate traveling northwest relative to the North American Plate.



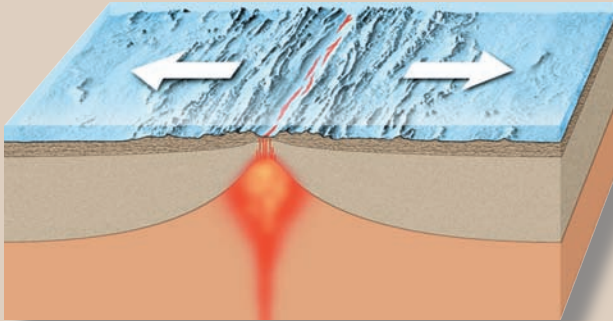
The earth's tectonic plates travel on currents of circulating magma.



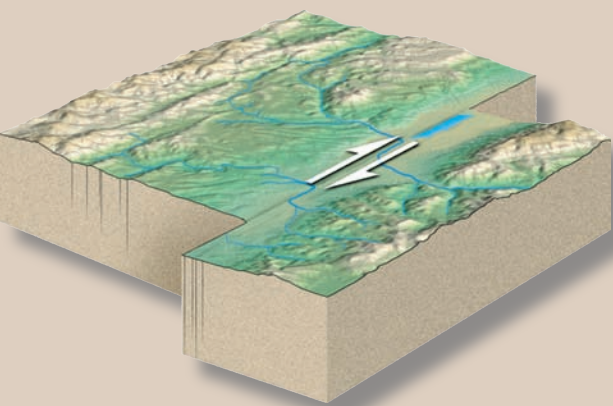
Subduction of an ancient oceanic plate under the North American plate ignites volcanoes and raises the mountains of the Sierra Nevada.



Converging continental plates compress and thrust land up to form the world's highest peaks, the Himalayas.



Hot magma emerges and cools creating new crust between diverging plate boundaries as in the middle of the Atlantic Ocean.



Along the San Andreas fault, the Pacific and North American plates slide past one another in transform movement.

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